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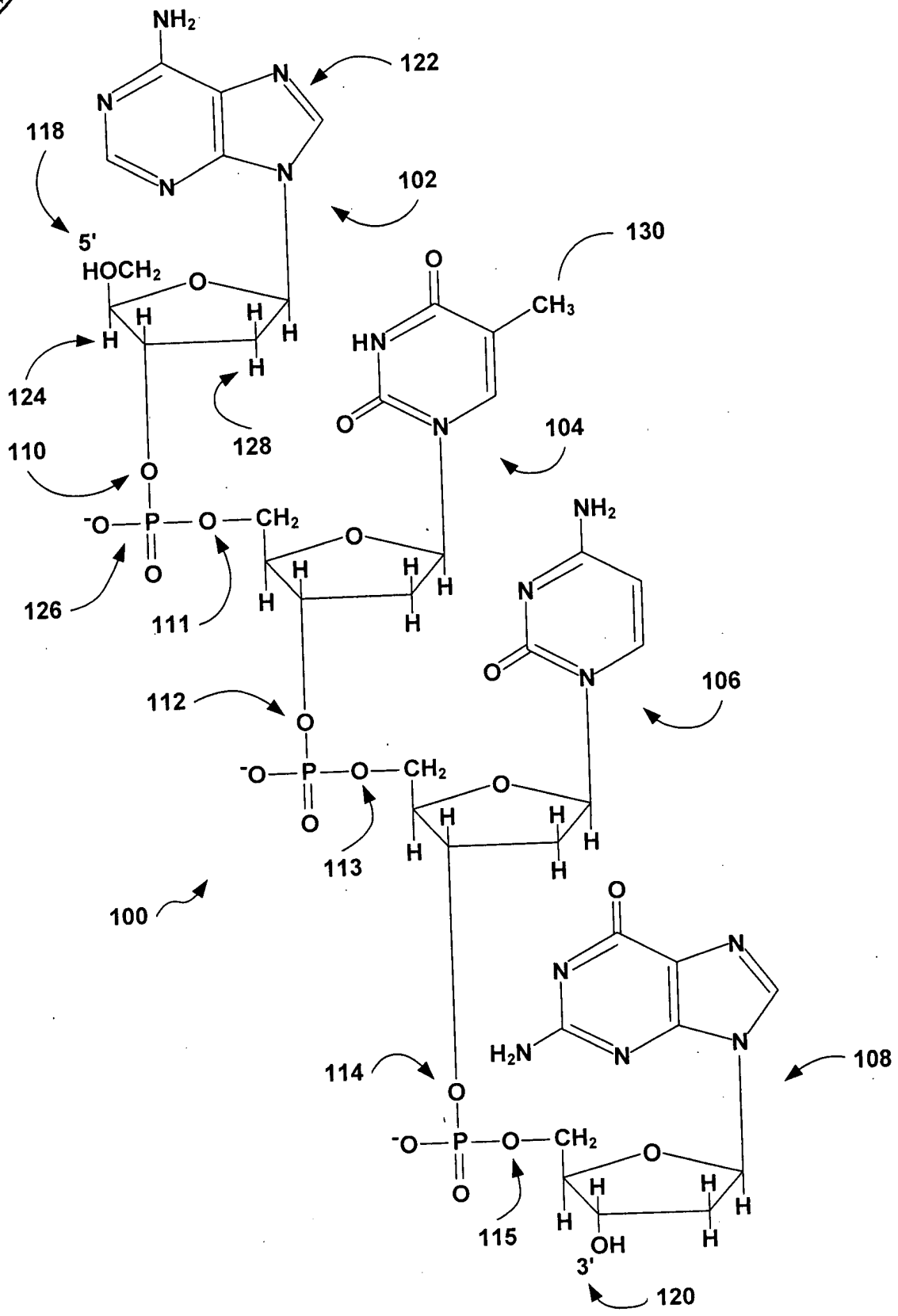

Figure 1

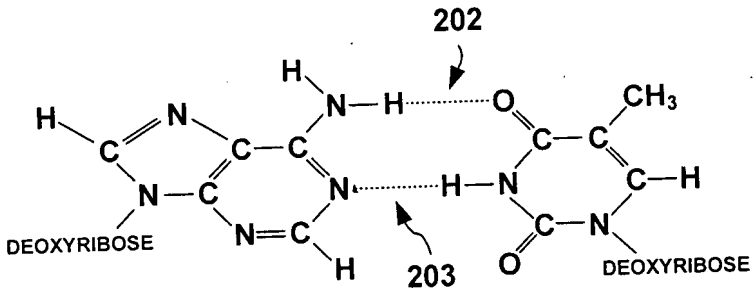

Figure 2A

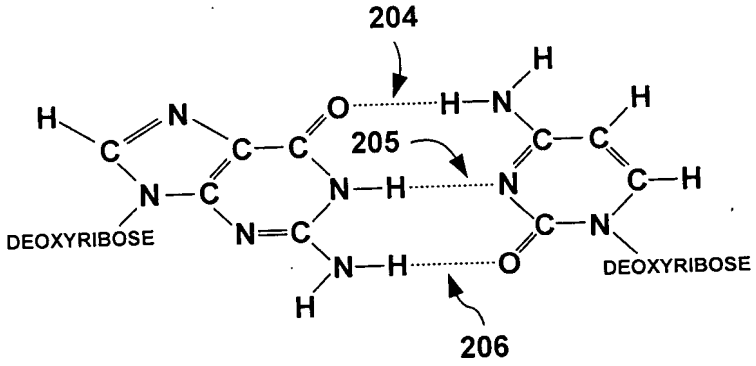

Figure 2B

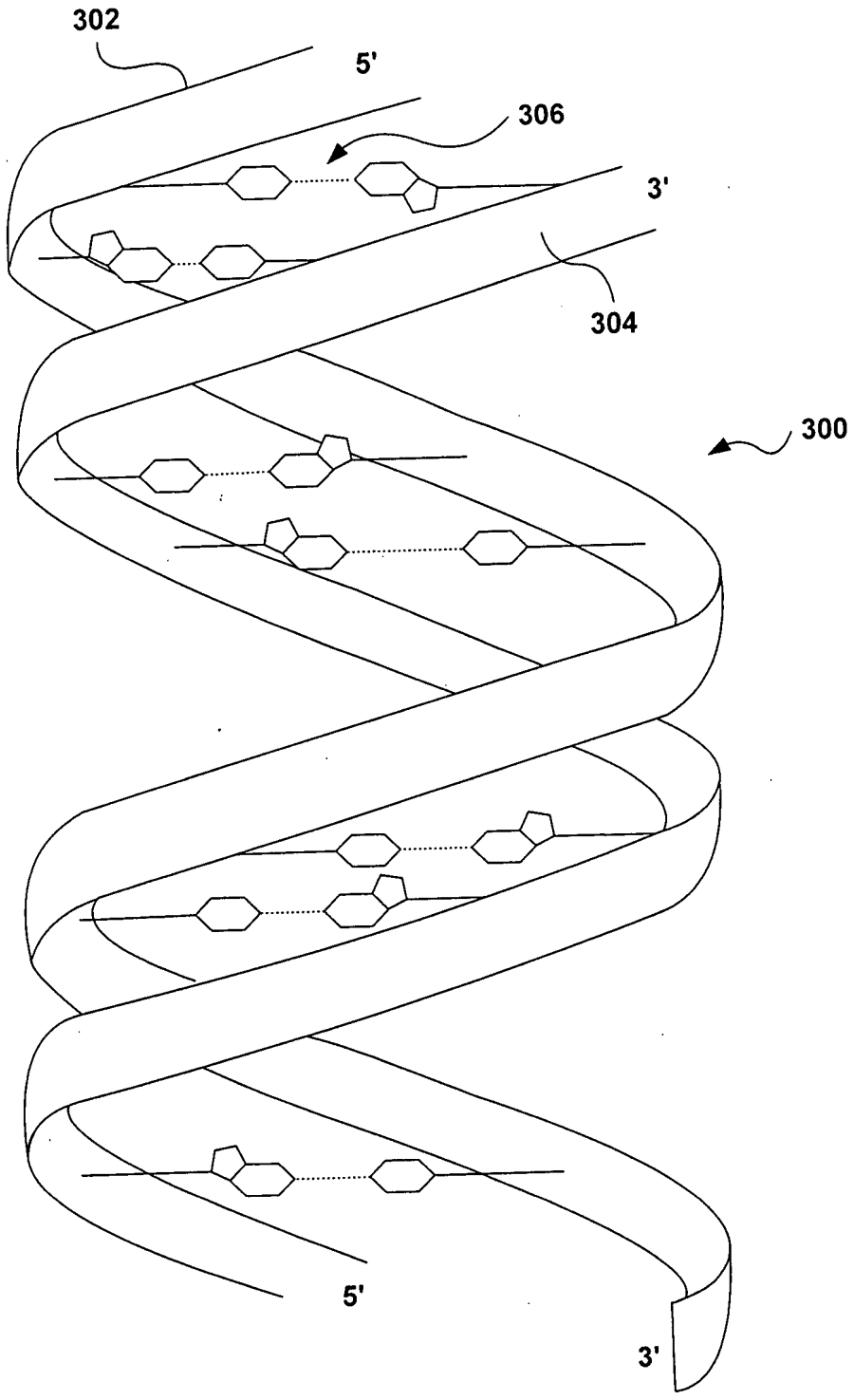

Figure 3

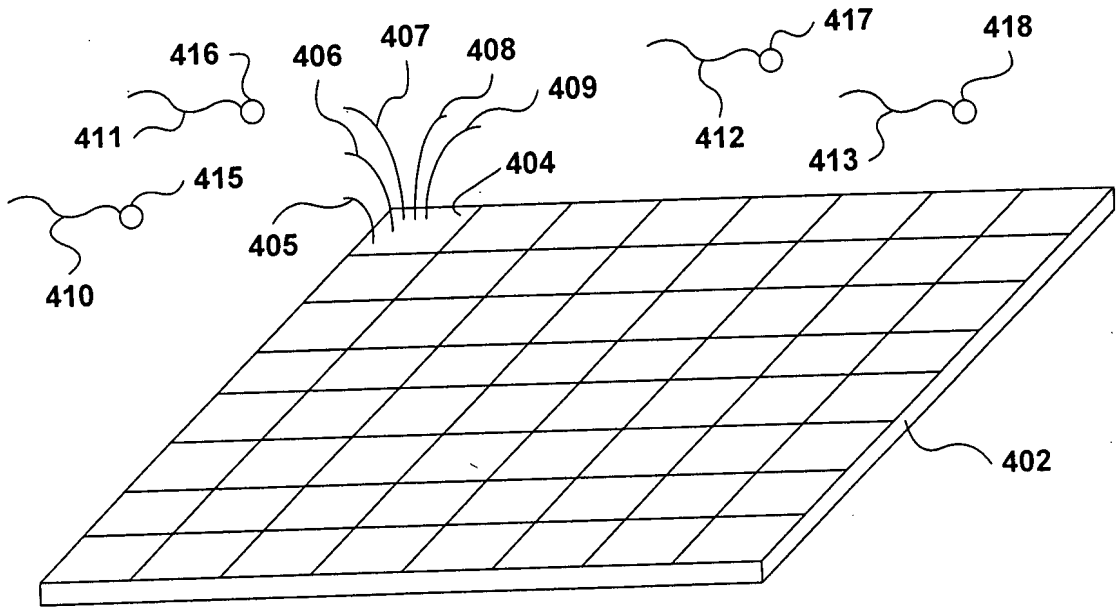

Figure 4

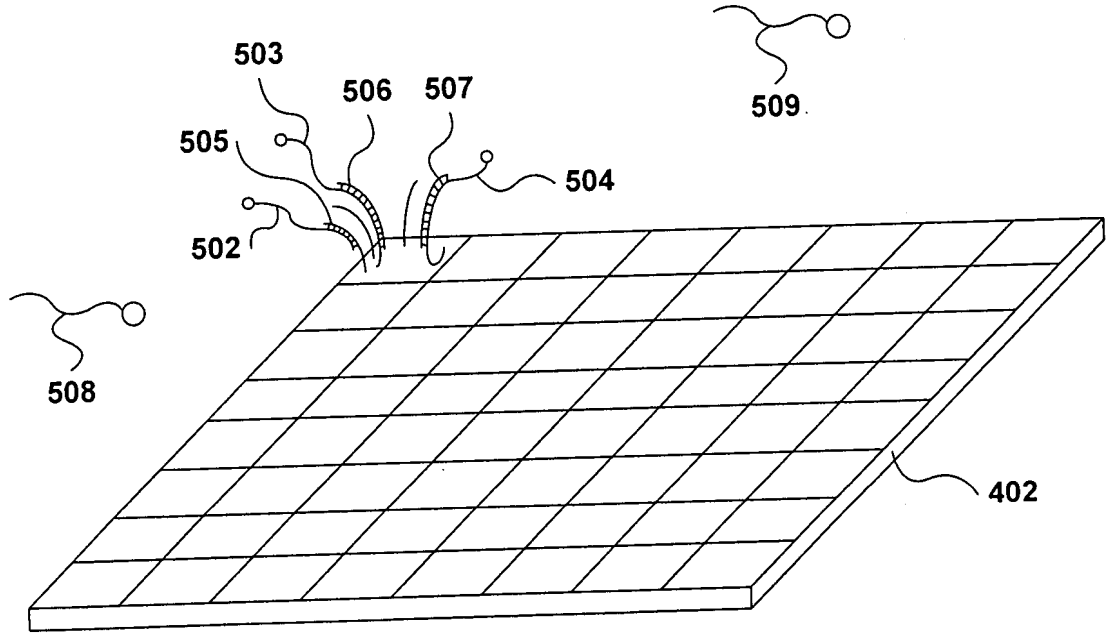

Figure 5

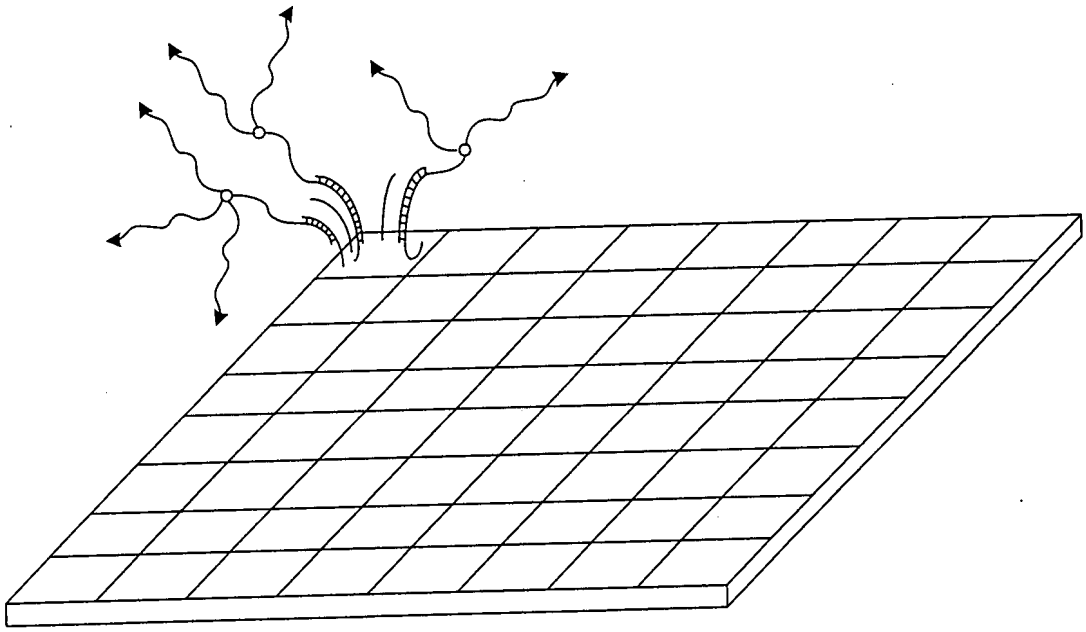

Figure 6

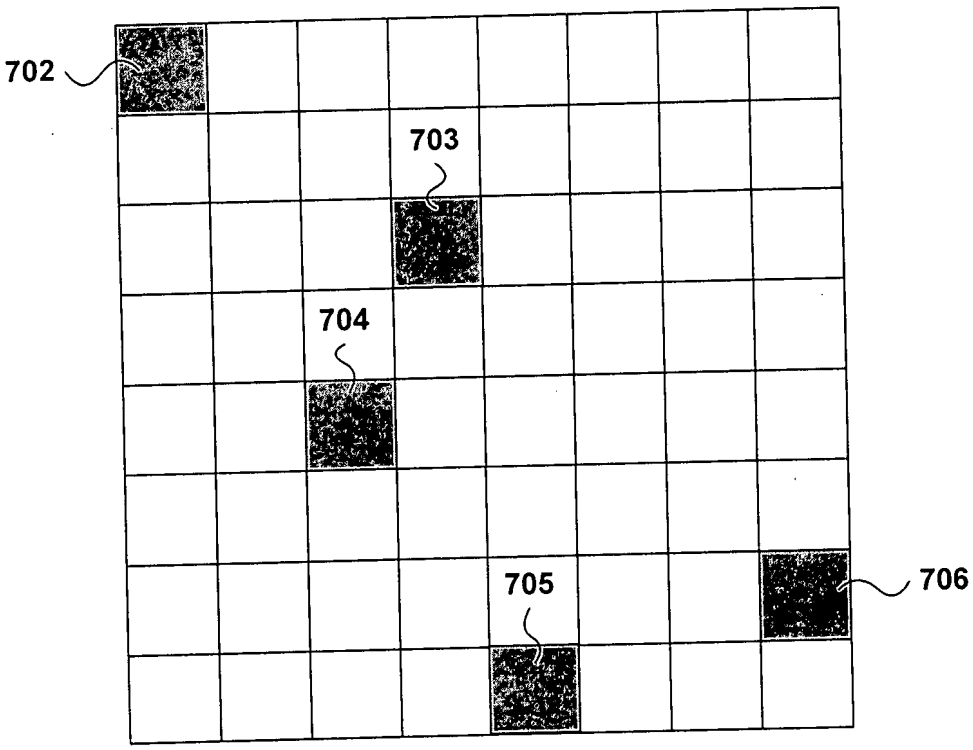

Figure 7

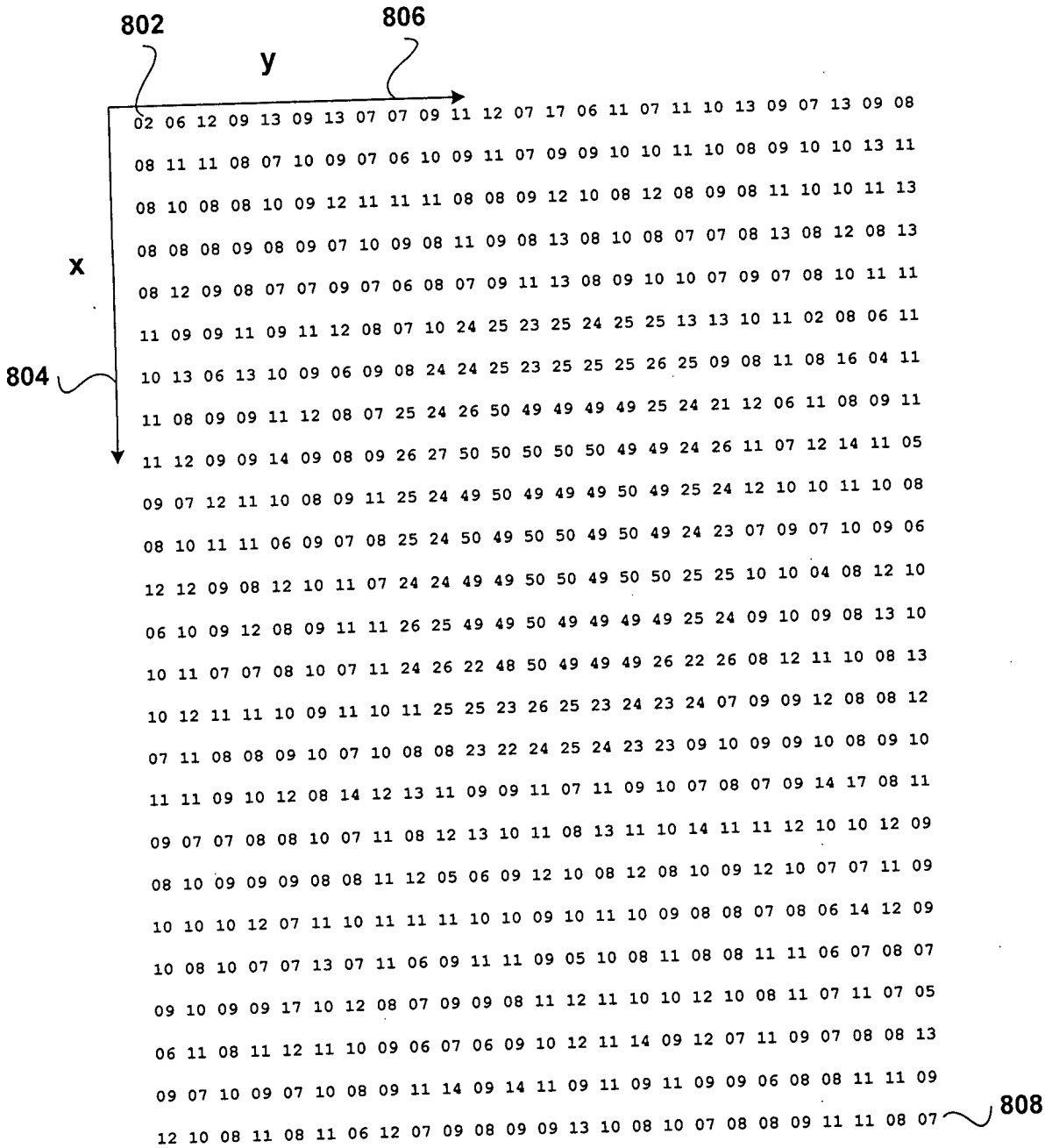
802
806
y
x
804
808
02 06 12 09 13 09 13 07 07 09 11 12 07 17 06 11 07 11 10 13 09 07 13 09 08
08 11 11 08 07 10 09 07 06 10 09 11 07 09 09 10 10 11 10 08 09 10 10 13 11
08 10 08 08 10 09 12 11 11 11 08 08 09 12 10 08 12 08 09 08 11 10 10 11 13
08 08 08 09 08 09 07 10 09 08 11 09 08 13 08 10 08 07 07 08 13 08 12 08 13
08 12 09 08 07 07 09 07 06 08 07 09 11 13 08 09 10 10 07 09 07 08 10 11 11
11 09 09 11 09 11 12 08 07 10 24 25 23 25 24 25 25 13 13 10 11 02 08 06 11
10 13 06 13 10 09 06 09 08 24 24 25 23 25 25 25 26 25 09 08 11 08 16 04 11
11 08 09 09 11 12 08 07 25 24 26 50 49 49 49 49 25 24 21 12 06 11 08 09 11
11 12 09 09 14 09 08 09 26 27 50 50 50 50 50 49 49 24 26 11 07 12 14 11 05
09 07 12 11 10 08 09 11 25 24 49 50 49 49 49 50 49 25 24 12 10 10 11 10 08
08 10 11 11 06 09 07 08 25 24 50 49 50 50 49 50 49 24 23 07 09 07 10 09 06
12 12 09 08 12 10 11 07 24 24 49 49 50 50 49 50 50 25 25 10 10 04 08 12 10
06 10 09 12 08 09 11 11 26 25 49 49 50 49 49 49 49 25 24 09 10 09 08 13 10
10 11 07 07 08 10 07 11 24 26 22 48 50 49 49 49 26 22 26 08 12 11 10 08 13
10 12 11 11 10 09 11 10 11 25 25 23 26 25 23 24 23 24 07 09 09 12 08 08 12
07 11 08 08 09 10 07 10 08 08 23 22 24 25 24 23 23 09 10 09 09 10 08 09 10
11 11 09 10 12 08 14 12 13 11 09 09 11 07 11 09 10 07 08 07 09 14 17 08 11
09 07 07 08 08 10 07 11 08 12 13 10 11 08 13 11 10 14 11 11 12 10 10 12 09
08 10 09 09 09 08 08 11 12 05 06 09 12 10 08 12 08 10 09 12 10 07 07 11 09
10 10 10 12 07 11 10 11 11 11 10 10 09 10 11 10 09 08 08 07 08 06 14 12 09
10 08 10 07 07 13 07 11 06 09 11 11 09 05 10 08 11 08 08 11 11 06 07 08 07
09 10 09 09 17 10 12 08 07 09 09 08 11 12 11 10 10 12 10 08 11 07 11 07 05
06 11 08 11 12 11 10 09 06 07 06 09 10 12 11 14 09 12 07 11 09 07 08 08 13
09 07 10 09 07 10 08 09 11 14 09 14 11 09 11 09 11 09 09 06 08 08 11 11 09
12 10 08 11 08 11 06 12 07 09 08 09 09 13 10 08 10 07 08 08 09 11 11 08 07

Figure 8A

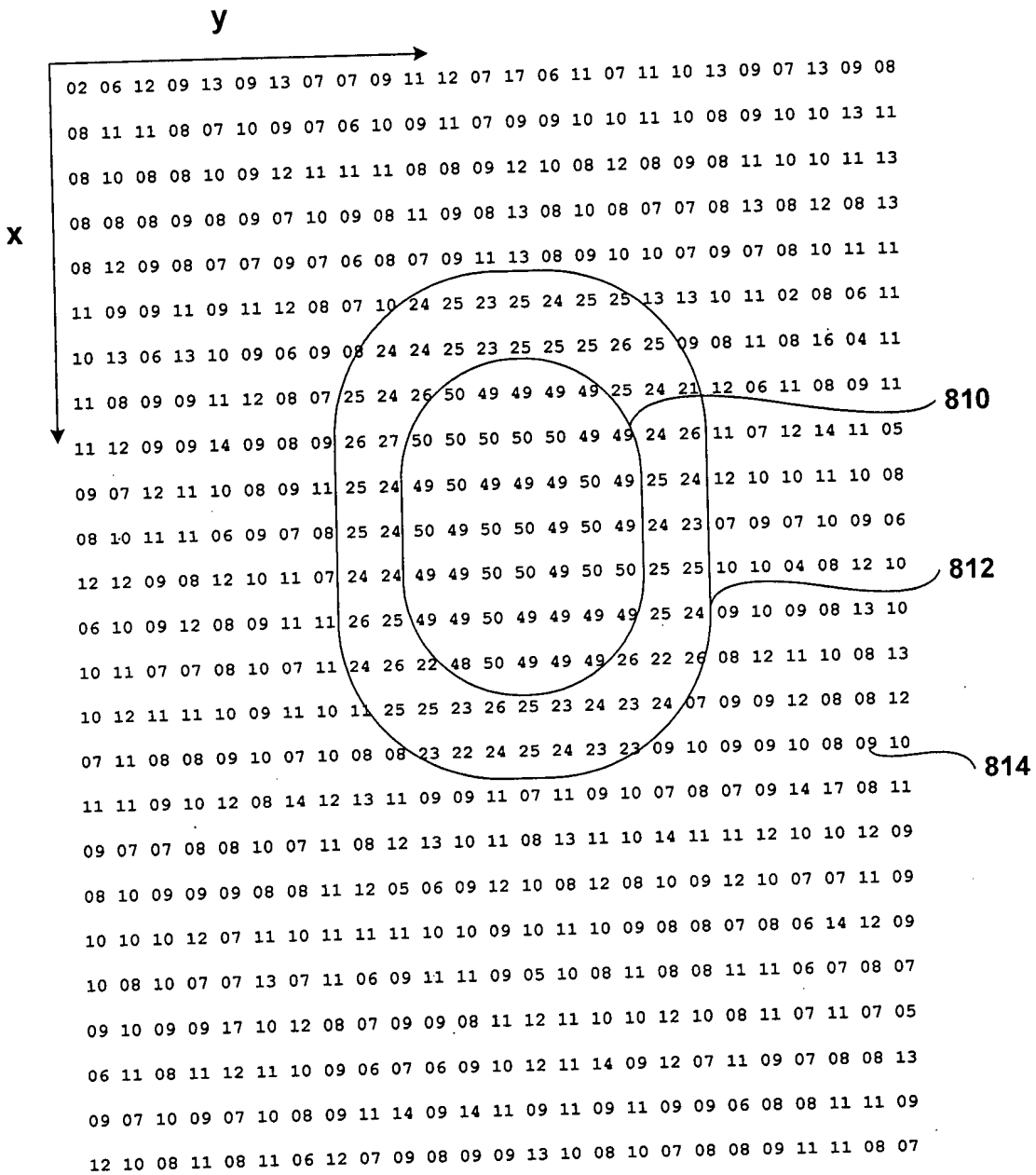
y
x
02 06 12 09 13 09 13 07 07 09 11 12 07 17 06 11 07 11 10 13 09 07 13 09 08
08 11 11 08 07 10 09 07 06 10 09 11 07 09 09 10 10 11 10 08 09 10 10 13 11
08 10 08 08 10 09 12 11 11 11 08 08 09 12 10 08 12 08 09 08 11 10 10 11 13
08 08 08 09 08 09 07 10 09 08 11 09 08 13 08 10 08 07 07 08 13 08 12 08 13
08 12 09 08 07 07 09 07 06 08 07 09 11 13 08 09 10 10 07 09 07 08 10 11 11
11 09 09 11 09 11 12 08 07 10 24 25 23 25 24 25 25 13 13 10 11 02 08 06 11
10 13 06 13 10 09 06 09 08 24 24 25 23 25 25 25 26 25 09 08 11 08 16 04 11
11 08 09 09 11 12 08 07 25 24 26 50 49 49 49 49 25 24 21 12 06 11 08 09 11
11 12 09 09 14 09 08 09 26 27 50 50 50 50 50 49 49 24 26 11 07 12 14 11 05
09 07 12 11 10 08 09 11 25 24 49 50 49 49 49 50 49 25 24 12 10 10 11 10 08
08 10 11 11 06 09 07 08 25 24 50 49 50 50 49 50 49 24 23 07 09 07 10 09 06
12 12 09 08 12 10 11 07 24 24 49 49 50 50 49 50 50 25 25 10 10 04 08 12 10
06 10 09 12 08 09 11 11 26 25 49 49 50 49 49 49 49 25 24 09 10 09 08 13 10
10 11 07 07 08 10 07 11 24 26 22 48 50 49 49 49 26 22 26 08 12 11 10 08 13
10 12 11 11 10 09 11 10 11 25 25 23 26 25 23 24 23 24 07 09 09 12 08 08 12
07 11 08 08 09 10 07 10 08 08 23 22 24 25 24 23 23 09 10 09 09 10 08 09 10
11 11 09 10 12 08 14 12 13 11 09 09 11 07 11 09 10 07 08 07 09 14 17 08 11
09 07 07 08 08 10 07 11 08 12 13 10 11 08 13 11 10 14 11 11 12 10 10 12 09
08 10 09 09 09 08 08 11 12 05 06 09 12 10 08 12 08 10 09 12 10 07 07 11 09
10 10 10 12 07 11 10 11 11 11 10 10 09 10 11 10 09 08 08 07 08 06 14 12 09
10 08 10 07 07 13 07 11 06 09 11 11 09 05 10 08 11 08 08 11 11 06 07 08 07
09 10 09 09 17 10 12 08 07 09 09 08 11 12 11 10 10 12 10 08 11 07 11 07 05
06 11 08 11 12 11 10 09 06 07 06 09 10 12 11 14 09 12 07 11 09 07 08 08 13
09 07 10 09 07 10 08 09 11 14 09 14 11 09 11 09 11 09 09 06 08 08 11 11 09
12 10 08 11 08 11 06 12 07 09 08 09 09 13 10 08 10 07 08 08 09 11 11 08 07
810
812
814

Figure 8B

05 09 09 06 10 10 13 13 13 10 10 11 08 09 09 06 12 10 05 11 09 10 12 08 09

10 08 07 09 09 09 10 08 09 09 09 12 08 06 09 08 11 13 09 09 12 12 09 15 11

10 11 10 08 09 09 12 08 06 10 11 13 07 11 07 10 11 11 08 11 11 09 09 13 08

06 11 12 12 09 07 10 08 02 07 11 11 10 09 08 06 09 10 11 09 11 09 10 07 12

10 13 10 08 09 08 11 12 09 10 09 10 06 12 10 06 12 10 08 08 09 06 07 09 14

09 10 10 11 06 10 07 07 10 07 10 10 09 09 10 12 08 12 08 07 06 08 12 08 14

11 10 08 10 09 08 09 08 09 09 10 10 09 09 10 11 09 09 09 12 11 08 10 06 09

10 10 07 08 08 10 10 10 10 09 10 20 19 20 19 19 09 09 09 11 08 12 12 10 10

09 07 07 09 09 10 08 12 12 09 19 20 20 19 20 19 20 08 08 07 12 10 10 10 10

09 09 09 12 09 11 08 09 10 08 19 19 20 19 19 20 20 10 10 17 09 11 09 11 08

11 09 07 08 09 08 10 08 08 10 20 20 21 20 19 20 20 10 09 08 09 08 08 06 11

09 12 10 11 09 10 11 04 10 09 19 21 19 19 19 18 20 11 10 08 10 06 05 12 10

06 08 09 08 11 07 11 10 10 09 19 19 19 19 20 20 20 11 08 11 08 10 12 08 11

08 09 11 08 07 10 09 10 11 11 10 19 20 19 20 20 09 08 11 09 09 13 10 07 13

08 08 09 10 11 07 08 09 10 07 10 09 10 08 09 10 11 11 10 13 10 08 10 08 09

10 12 11 07 09 06 09 06 11 09 10 11 06 11 10 09 11 08 09 10 04 17 07 11 08

08 13 08 11 11 08 11 14 09 06 08 15 11 08 13 10 12 11 10 10 09 13 08 09 12

07 10 10 13 10 12 13 10 09 14 12 09 08 13 09 09 07 12 12 09 09 13 10 12 07

12 10 11 06 11 13 08 11 10 09 09 11 11 11 10 10 09 08 09 11 08 06 11 06 12

10 09 11 11 12 08 08 08 08 15 10 10 06 10 13 07 11 11 08 09 07 06 07 08 10

12 11 06 09 07 11 09 09 08 07 09 09 09 07 10 11 11 12 08 09 07 10 07 13 06

13 05 10 08 08 08 10 11 06 08 05 12 04 13 09 02 10 09 12 10 09 12 10 09 06

09 08 12 12 11 08 11 12 06 06 09 10 07 08 07 08 07 09 09 12 07 09 07 09 10

09 10 09 11 09 10 11 11 12 09 06 08 08 11 09 09 08 12 06 13 07 09 11 10 09

08 13 09 08 06 09 06 10 09 09 10 11 08 11 07 07 09 09 15 15 10 12 12 07 09

Figure 8C

05 09 09 06 10 10 13 13 13 10 10 11 08 09 09 06 12 10 05 11 09 10 12 08 09

10 08 07 09 09 09 10 08 09 09 09 12 08 06 09 08 11 13 09 09 12 12 09 15 11

10 11 10 08 09 09 12 08 06 10 11 13 07 11 07 10 11 11 08 11 11 09 09 13 08

06 11 12 12 09 07 10 08 02 07 11 11 10 09 08 06 09 10 11 09 11 09 10 07 12

10 13 10 08 09 08 11 12 09 10 09 10 06 12 10 06 12 10 08 08 09 06 07 09 14

09 10 10 11 06 10 07 07 10 07 10 10 09 09 10 12 08 12 08 07 06 08 12 08 14

11 10 08 10 09 08 09 08 09 09 10 10 09 09 10 11 09 09 09 12 11 08 10 06 09

10 10 07 08 08 10 10 10 10 09 10 20 19 20 19 19 09 09 09 11 08 12 12 10 10

09 07 07 09 09 10 08 12 12 09 19 20 20 19 20 19 20 08 08 07 12 10 10 10 10

09 09 09 12 09 11 08 09 10 08 19 19 20 19 19 20 20 10 10 17 09 11 09 11 08

11 09 07 08 09 08 10 08 08 10 20 20 21 20 19 20 20 10 09 08 09 08 08 06 11

09 12 10 11 09 10 11 04 10 09 19 21 19 19 19 18 20 11 10 08 10 06 05 12 10

06 08 09 08 11 07 11 10 10 09 19 19 19 19 20 20 20 11 08 11 08 10 12 08 11

08 09 11 08 07 10 09 10 11 11 10 19 20 19 20 20 09 08 11 09 09 13 10 07 13

08 08 09 10 11 07 08 09 10 07 10 09 10 08 09 10 11 11 10 13 10 08 10 08 09

10 12 11 07 09 06 09 06 11 09 10 11 06 11 10 09 11 08 09 10 04 17 07 11 08

08 13 08 11 11 08 11 14 09 06 08 15 11 08 13 10 12 11 10 10 09 13 08 09 12

07 10 10 13 10 12 13 10 09 14 12 09 08 13 09 09 07 12 12 09 09 13 10 12 07

12 10 11 06 11 13 08 11 10 09 09 11 11 11 10 10 09 08 09 11 08 06 11 06 12

10 09 11 11 12 08 08 08 08 15 10 10 06 10 13 07 11 11 08 09 07 06 07 08 10

12 11 06 09 07 11 09 09 08 07 09 09 09 07 10 11 11 12 08 09 07 10 07 13 06

13 05 10 08 08 08 10 11 06 08 05 12 04 13 09 02 10 09 12 10 09 12 10 09 06

09 08 12 12 11 08 11 12 06 06 09 10 07 08 07 08 07 09 09 12 07 09 07 09 10

09 10 09 11 09 10 11 11 12 09 06 08 08 11 09 09 08 12 06 13 07 09 11 10 09

08 13 09 08 06 09 06 10 09 09 10 11 08 11 07 07 09 09 15 15 10 12 12 07 09

Figure 8D

12 09 10 10 08 09 12 11 09 07 09 08 09 10 17 12 05 11 06 09 10 09 11 08 11

13 10 10 09 11 10 11 10 11 10 04 07 09 10 13 09 08 09 12 08 06 14 11 13 09

09 07 08 10 14 09 07 07 09 12 06 17 08 10 09 07 06 10 09 08 08 08 10 07 10

10 11 10 09 07 06 07 14 09 10 06 10 10 14 09 07 08 08 06 12 09 17 08 07 07

11 11 12 09 02 10 11 14 11 08 09 10 07 09 10 08 10 09 13 10 08 09 11 11 09

07 08 11 10 12 11 10 13 08 08 07 07 07 07 07 06 06 13 02 07 06 11 12 05 05

11 17 11 08 08 10 07 10 12 07 05 08 08 07 08 08 07 06 10 11 09 13 12 11 11

10 08 11 10 10 07 08 09 08 09 07 15 14 15 15 15 06 08 06 09 10 10 12 08 11

12 11 11 10 06 09 12 10 07 06 14 14 14 15 14 16 15 06 08 12 12 11 08 08 05

11 09 09 06 11 08 09 14 07 07 15 16 14 14 15 15 15 06 07 10 07 11 13 12 11

10 08 11 09 12 09 09 08 07 06 15 14 15 14 15 15 14 08 08 09 08 11 13 12 12

06 11 11 02 08 05 09 08 07 08 15 14 15 14 14 15 14 08 06 07 11 07 11 10 08

11 10 13 12 08 08 10 07 08 09 14 14 14 15 15 15 15 07 07 06 10 09 07 11 09

14 09 11 12 10 13 10 11 07 06 05 14 14 15 15 14 07 08 07 06 09 10 09 10 09

05 10 08 09 14 07 10 06 08 07 07 06 07 07 06 07 08 08 11 13 11 08 07 12 07

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09 10 11 12 09 10 06 12 11 09 10 14 12 09 08 07 07 11 10 10 10 08 10 10 10

10 09 07 09 08 05 08 09 11 10 11 07 11 12 10 12 11 12 11 10 10 11 11 10 11

12 08 07 07 07 13 10 09 12 12 07 12 05 12 08 12 07 10 12 07 10 12 05 10 06

09 11 09 07 09 10 09 09 08 07 09 12 06 06 12 11 08 10 11 13 09 10 10 10 09

13 11 11 12 07 07 08 06 11 09 12 10 10 09 08 10 09 12 08 12 09 06 08 08 13

13 09 08 11 06 07 08 06 09 08 12 10 12 11 10 15 08 10 09 08 12 10 07 02 09

09 11 11 11 12 12 11 05 09 10 08 09 09 10 07 11 09 13 08 10 08 09 10 08 07

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12 10 09 08 07 10 09 11 12 09 08 08 09 06 09 11 07 05 07 08 12 09 08 11 14

Figure 8E

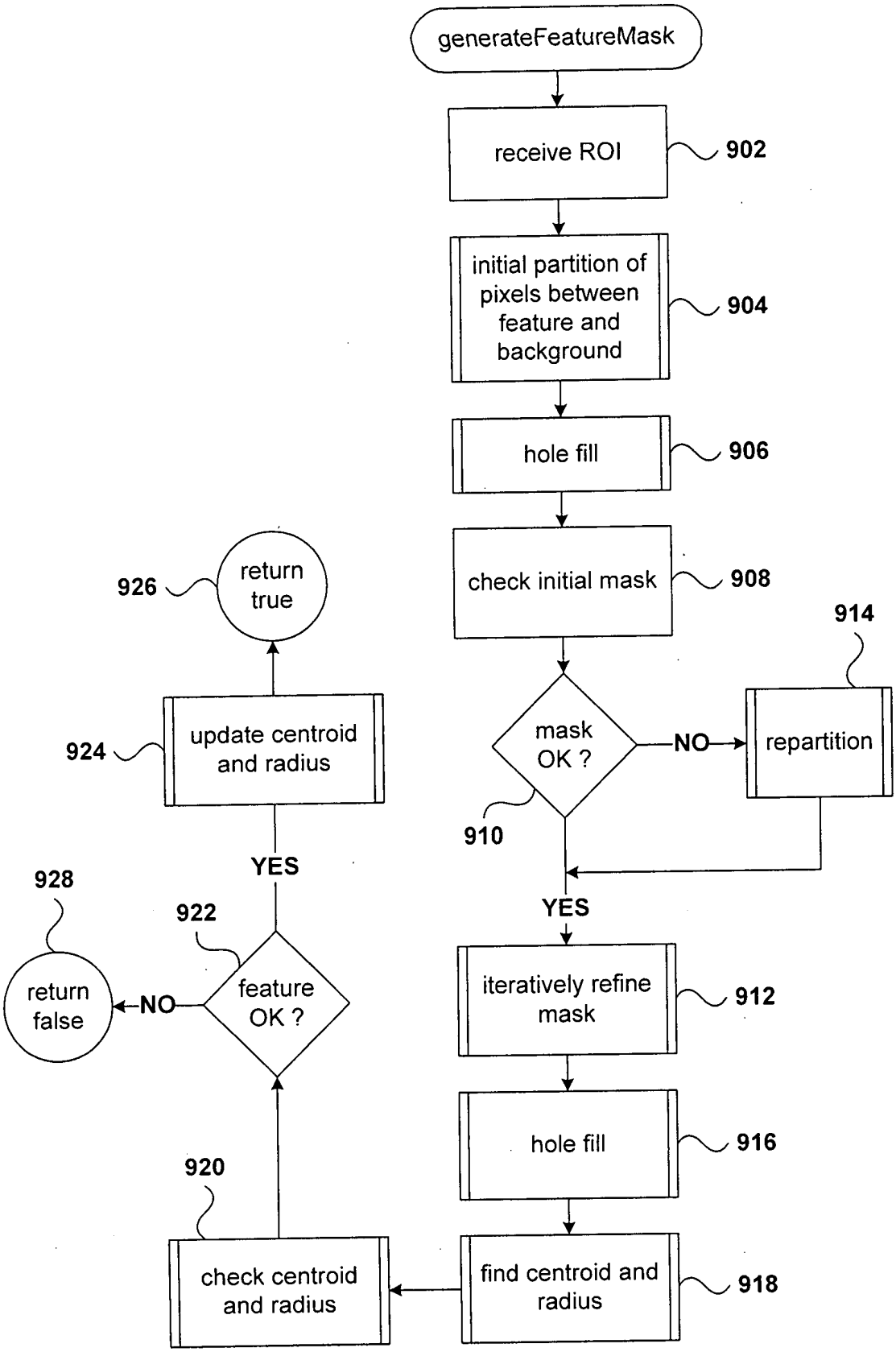
generateFeatureMask
receive ROI
902
initial partition of pixels between feature and background
904
hole fill
906
check initial mask
908
914
mask OK ?
NO
repartition
910
YES
iteratively refine mask
912
hole fill
916
find centroid and radius
918
check centroid and radius
920
feature OK ?
922
NO
return false
928
YES
update centroid and radius
924
return true
926

Figure 9

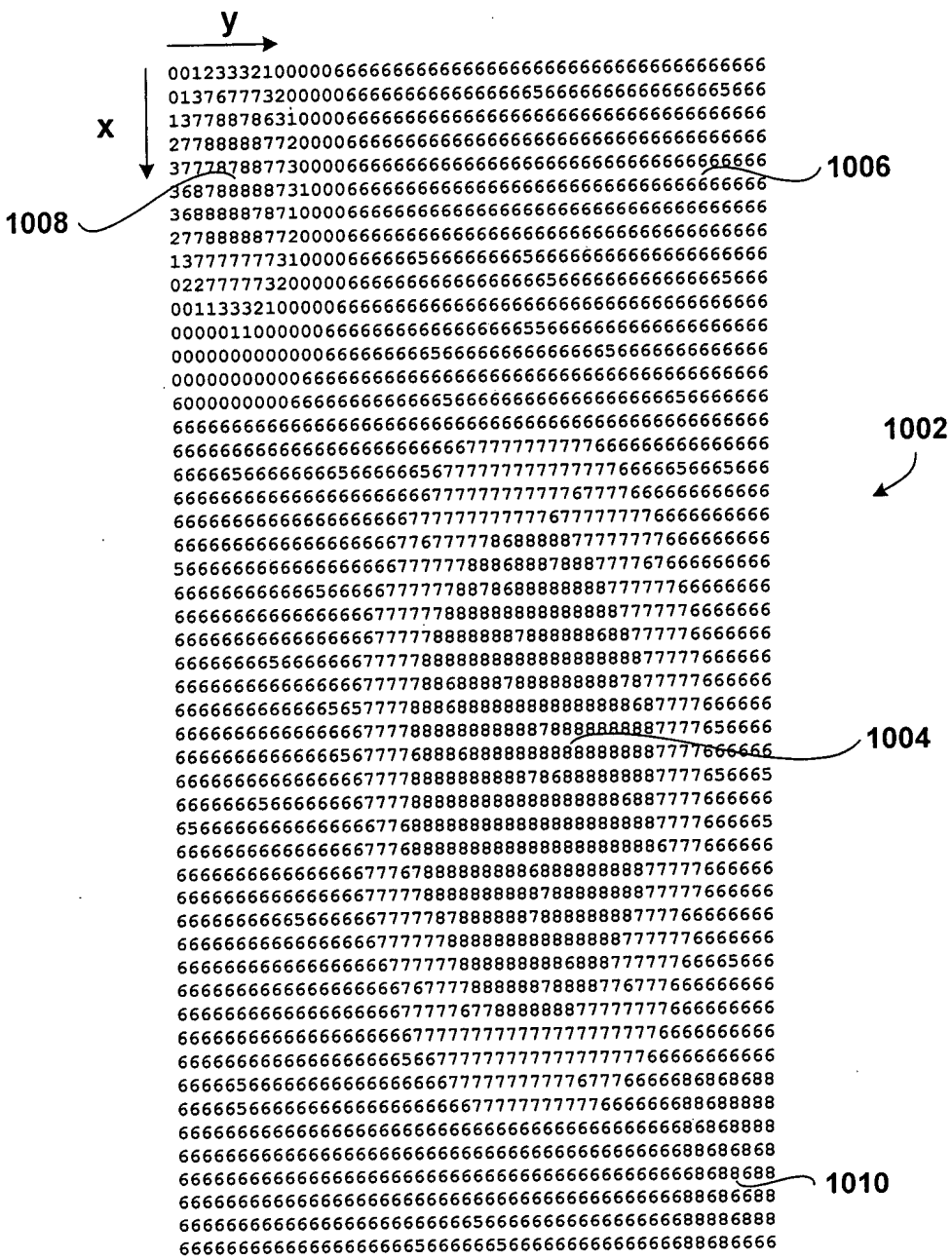

Figure 10

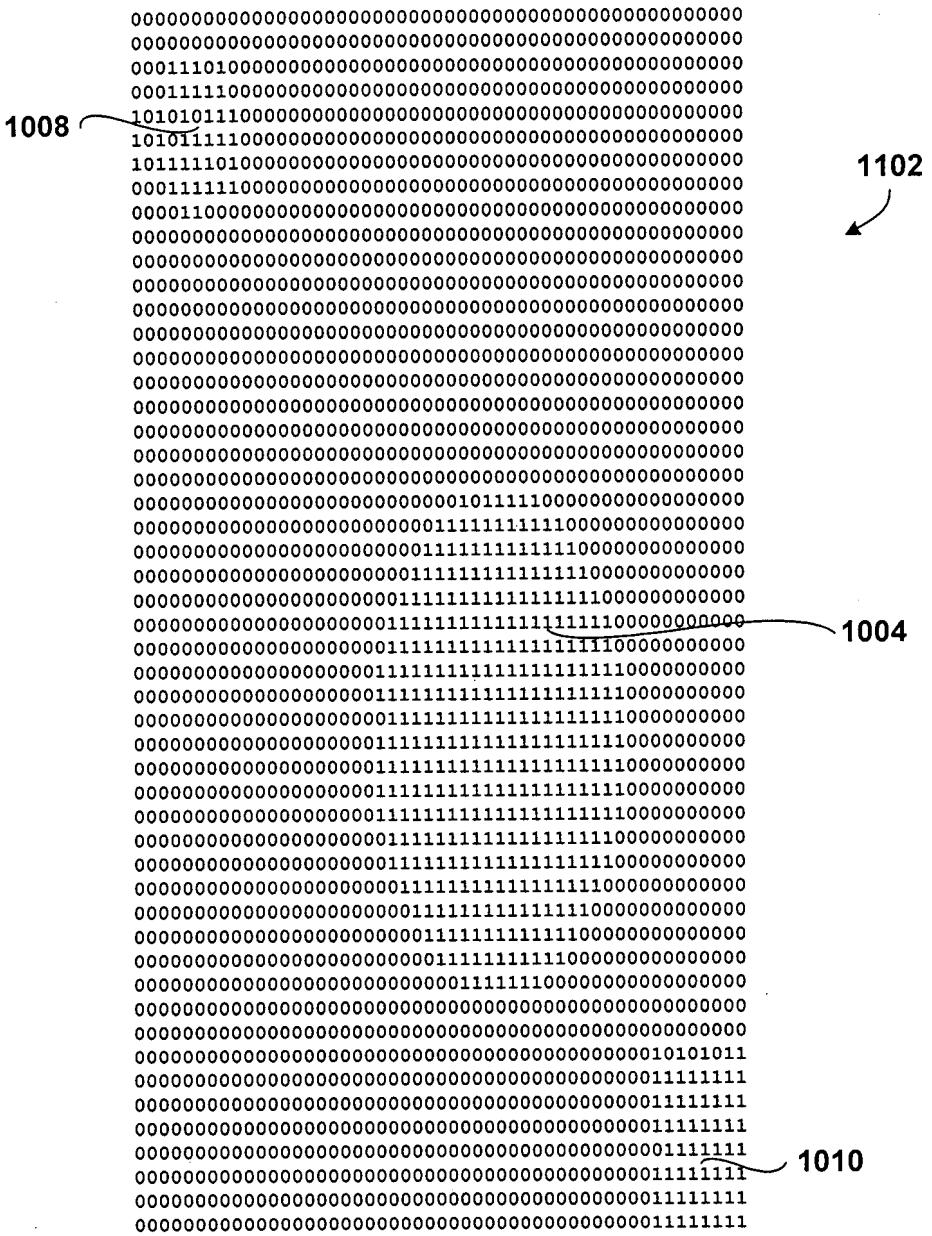

Figure 11

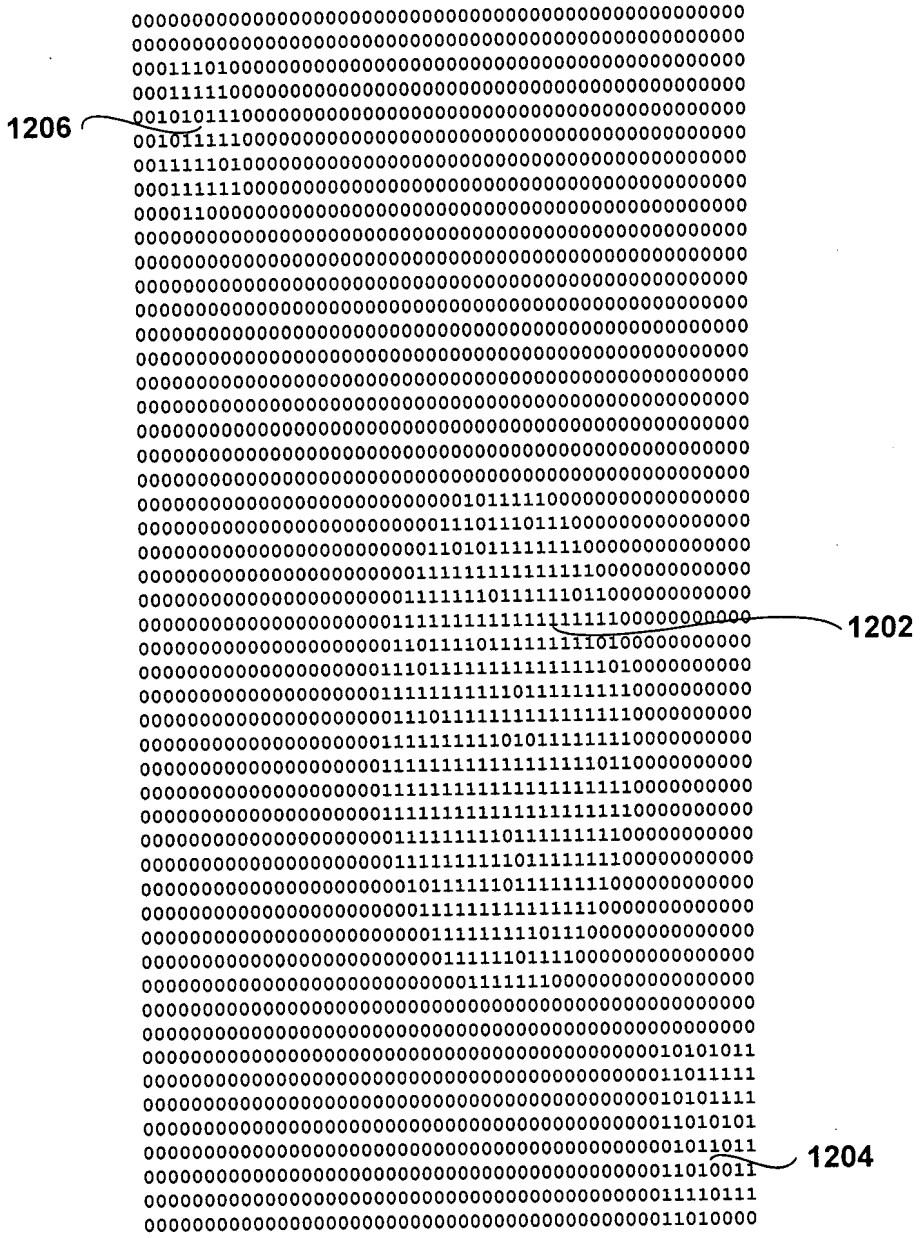

Figure 12

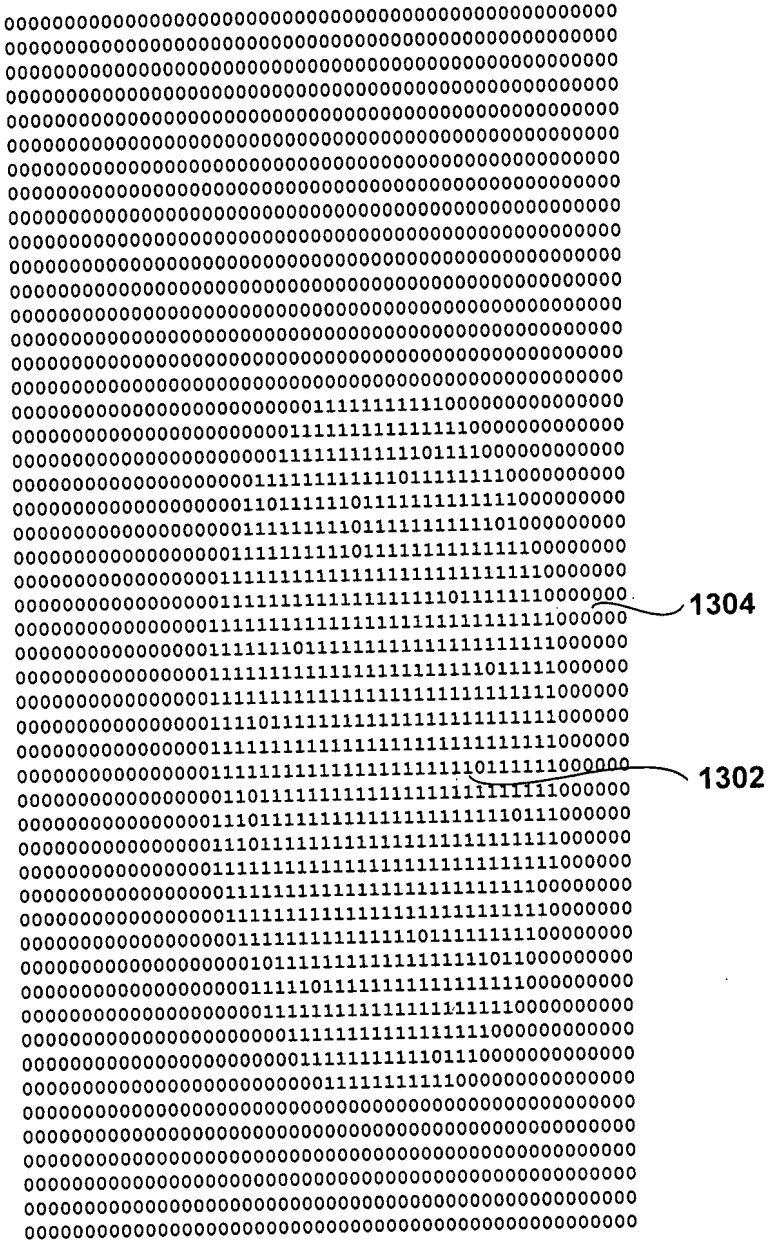

Figure 13

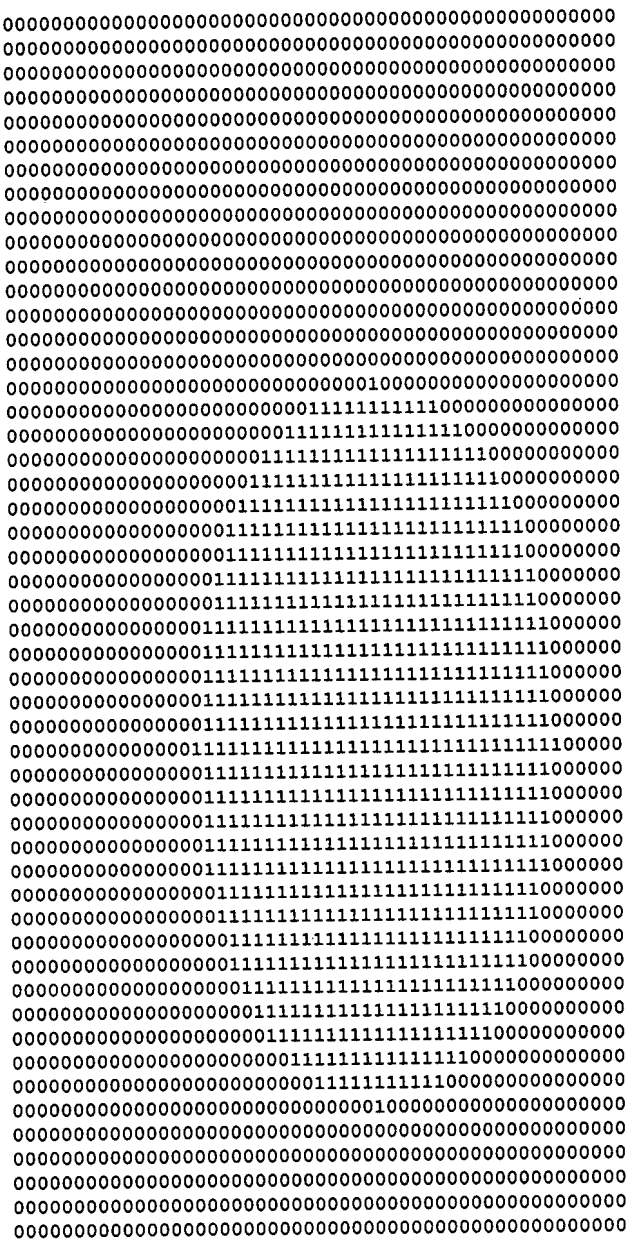

Figure 14

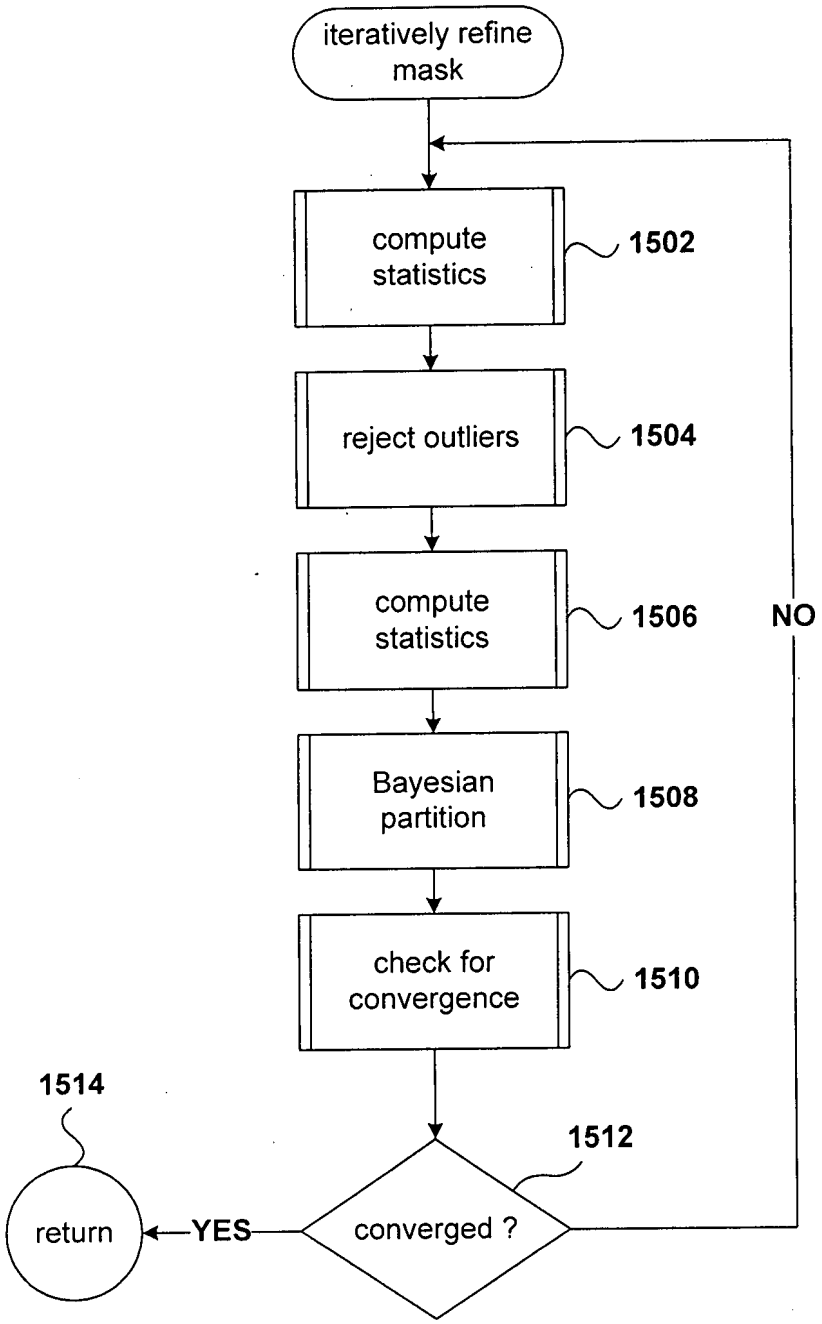
iteratively refine mask
compute statistics
1502
reject outliers
1504
compute statistics
1506
NO
Bayesian partition
1508
check for convergence
1510
1514
1512
return
YES
converged ?

Figure 15

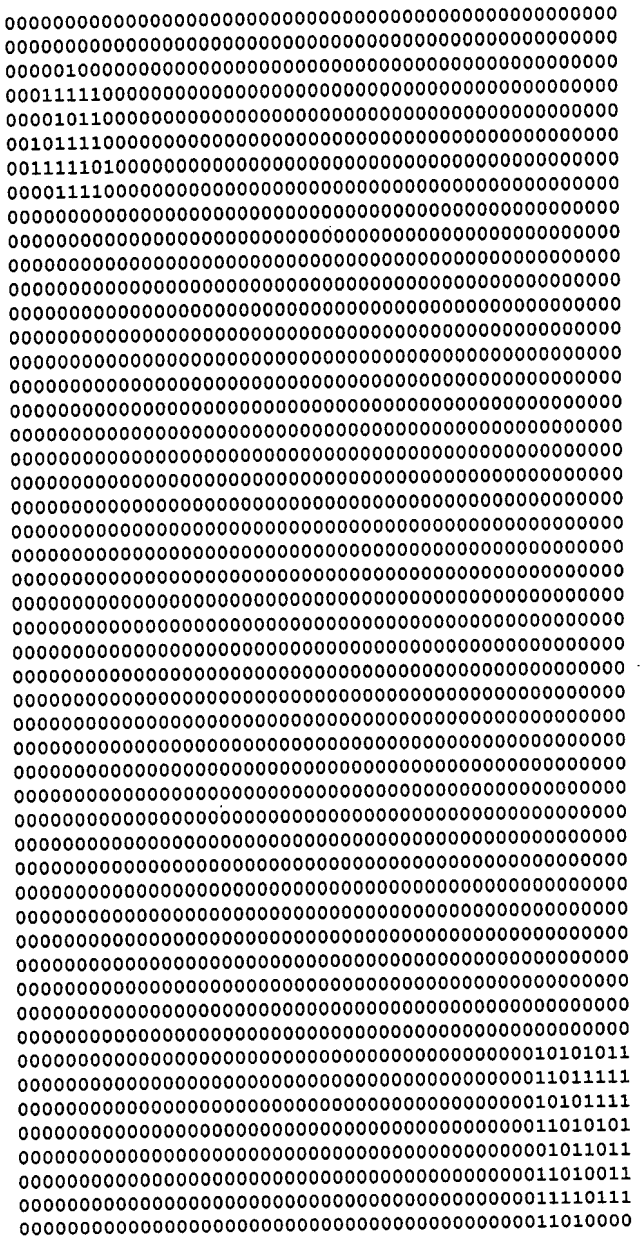

Figure 16

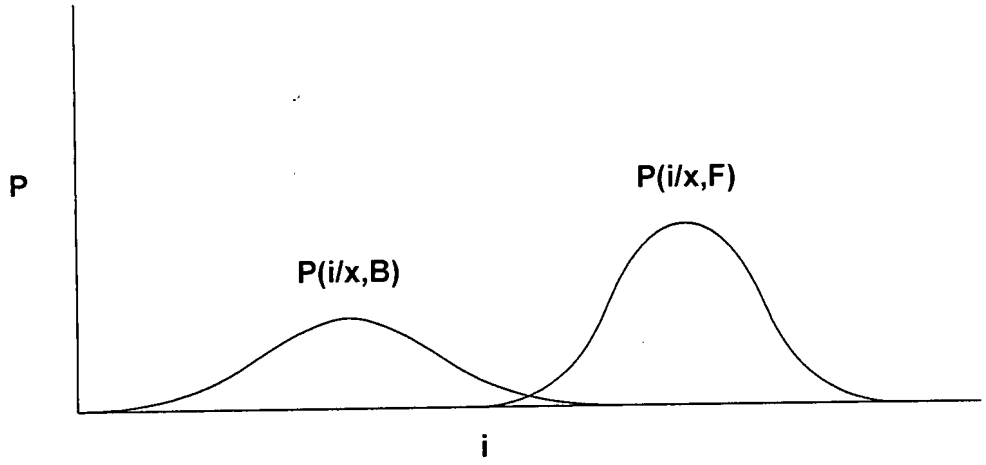

Figure 17A

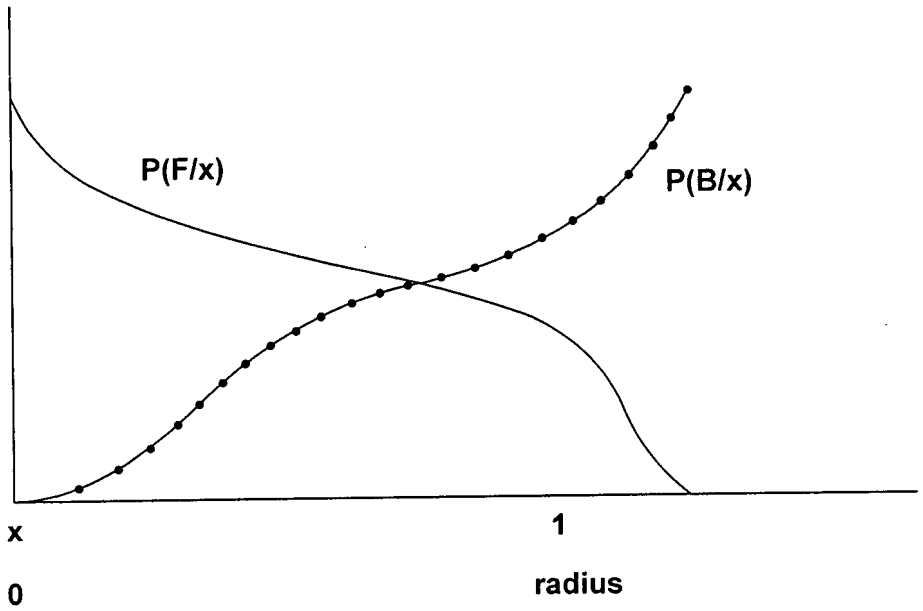

Figure 17B

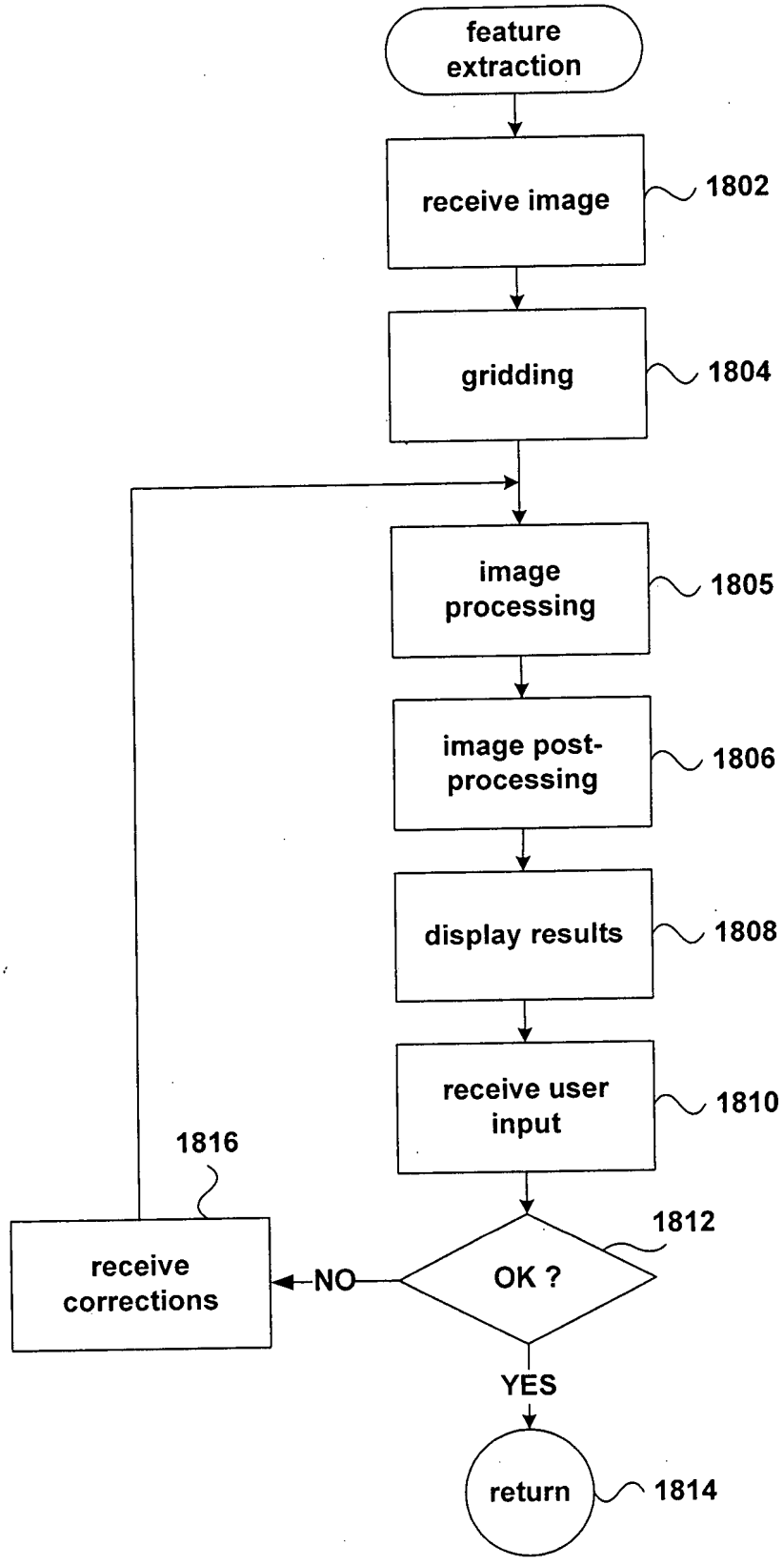
feature extraction
receive image
1802
gridding
1804
image processing
1805
image post-processing
1806
display results
1808
receive user input
1810
1812
OK ?
NO
receive corrections
1816
YES
return
1814

Figure 18

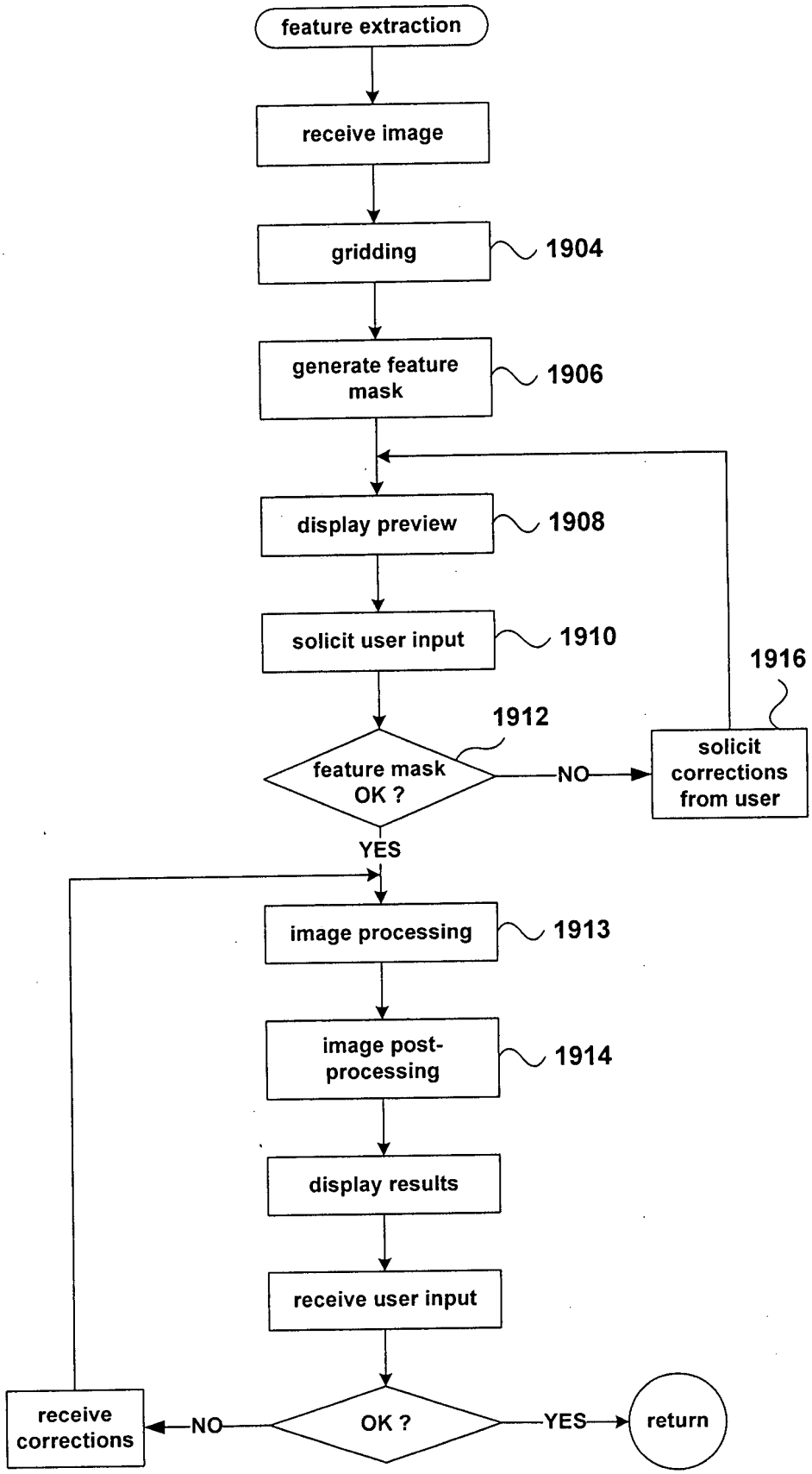
feature extraction
receive image
gridding
1904
generate feature mask
1906
display preview
1908
solicit user input
1910
1916
1912
feature mask OK ?
NO
solicit corrections from user
YES
image processing
1913
image post-processing
1914
display results
receive user input
receive corrections
NO
OK ?
YES
return

Figure 19

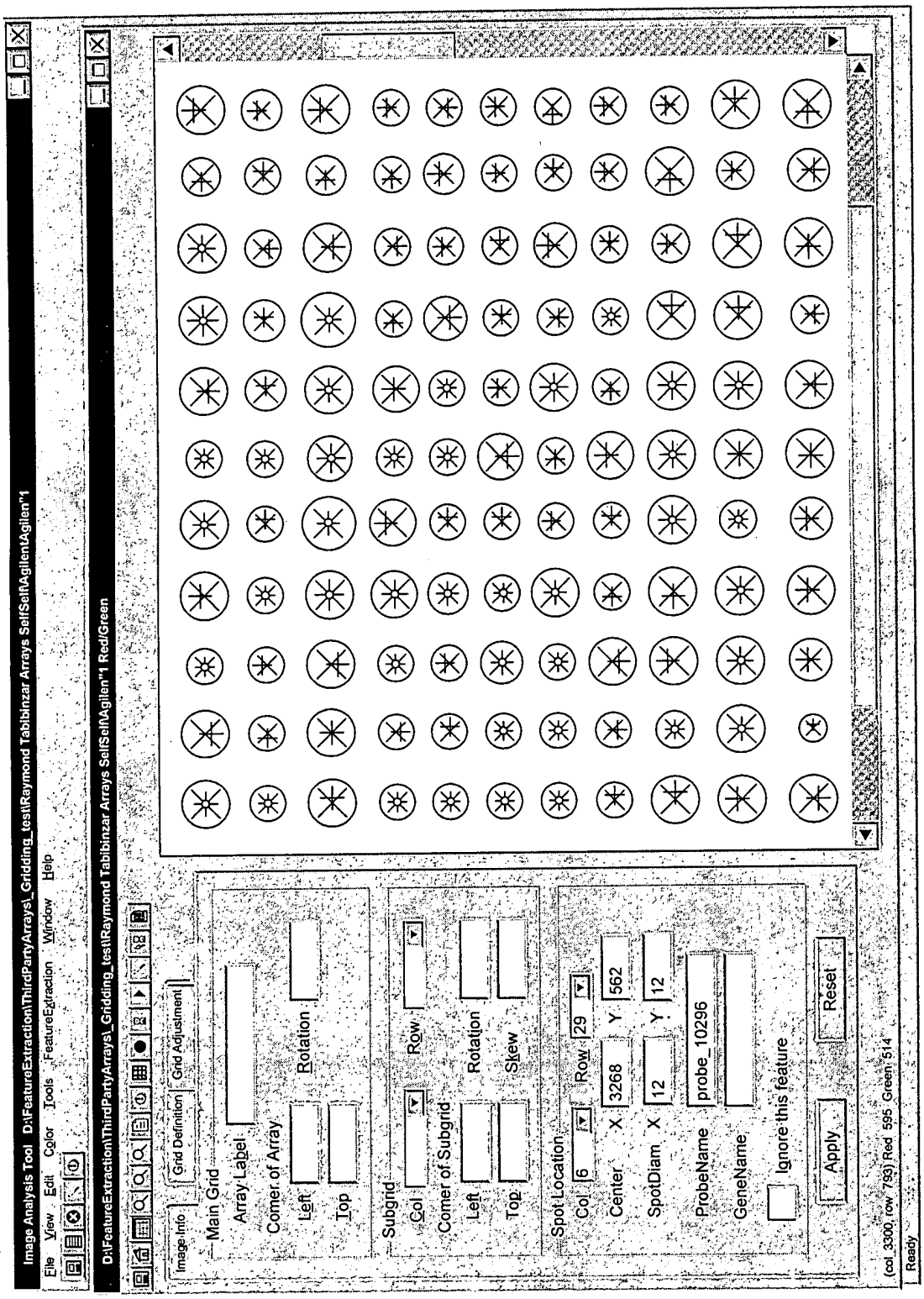
Image Analysis Tool D:\FeatureExtraction\ThirdPartyArrays_Gridding_test\Raymond Tabibinzar Arrays Self\Self\Agilent\Agilen"1
File View Edit Color Tools FeatureExtraction Window Help
D:\FeatureExtraction\ThirdPartyArrays_Gridding_test\Raymond Tabibinzar Arrays Self\Self\Agilen"1 Red/Green
Image Info
Grid Definition
Grid Adjustment
Main Grid
Array Label
Corner of Array
Rotation
Left
Top
Subgrid
Col
Row
Corner of Subgrid
Rotation
Left
Top
Skew
Spot Location
Col 6
Row 29
Center X 3268 Y 562
SpotDiam X 12 Y 12
ProbeName probe_10296
GeneName
Ignore this feature
Apply
Reset
(col, 3300, row 793) Red 595 Green 514
Ready

Figure 20